

Claims

1. A method of enriching a component of a gas mixture, characterized in that the component flowing in the gas mixture is dissolved in a solvent cooled to below 293 °K.

5 2. The method according to the previous claim, characterized in that hyperpolarized atomic nuclei are enriched.

3. The method according to claim 1 or 2, characterized in that an organic hydrocarbon is used as
10 solvent.

4. The method according to any of the previous claims, characterized in that a solvent with an Ostwald coefficient of at least 2 is used for the hyperpolarized atomic nuclei or the component to be enriched.

15 5. The method according to any of the previous claims, characterized in that ethanol, toluol, benzene, olive oil, butanol, pentane, methanol and/or acetone are used as solvent.

20 6. The method according to any of the previous claims, wherein ^{129}Xe or ^{13}C are enriched.

7. The method according to any of the previous claims, characterized in that a deuterized solvent is used.

8. The method according to any of the previous claims, wherein during enrichment, the cooled solvent is exposed to a maximum magnetic field of about 0.01 to 0.04 Tesla.

9. The method according to any of the previous claims, wherein a temperature from 10 to 180 °K of the cooled solvent is used.

10. The method according to any of the previous claims, wherein degassing from the solvent is done following solution of the component or the hyperpolarized atomic nuclei.

11. The method according to the previous claim, wherein the solvent prior to degassing is guided into a chamber for degassing.

12. The method according to any of the previous claims, characterized in that the steps for dissolving and degassing the components or the hyperpolarized atomic nuclei in and from the cooled solvent are repeated at least once.

13. The method according to any of the previous claims, wherein a lowering of the melting point of the solvent occurs by dissolving the component to be enriched.

14. An apparatus for carrying out the method according to any of the previous claims 1 to 13, comprising at least a chamber with means for degassing an enriched component.

15. The apparatus according to claim 14, comprising at least a chamber with a cooling apparatus.

16. The apparatus according to any of the previous claims 14 or 15, characterized by means for forming a maximum magnetic field of 0.04 T.

17. The apparatus according to claim 16, comprising at least a Heimholtz coil and/or a permanent magnet.

18. The apparatus according to any of the previous claims 14 to 17, characterized by a tank for the enriched component connected with the degassing chamber.

19. The apparatus according to any of the previous claims 14 to 18, characterized in that the inner walls of the

chambers, tank or other connecting lines comprise especially deuterized monochlorosilane and/or PFA.

20. The use of solvents cooled to below 293 °K for enrichment, storage and/or transport of hyperpolarized atomic nuclei or ^{13}C .

21. The use according to the previous claim 20, characterized by ethanol, toluol, benzene, olive oil, butanol, pentane, methanol and/or acetone as solvent.

22. The use according to any of the previous claims 20 or 21, characterized by a lipophilic hydrocarbon as solvent.

23. The use according to any of the previous claims 20 to 22, characterized by a deuterized solvent.

24. A solvent in which hyperpolarized atomic nuclei or ^{13}C are dissolved, characterized in that the solvent has a temperature of below 293 °K.

25. The solvent according the previous claim 24, characterized by ethanol, toluol, benzene, olive oil, butanol, pentane, methanol and/or acetone as solvent.

26. The solvent according to any of the previous claims 24 or 25, characterized in that the solvent is deuterized.

27. The solvent according to any of the previous claims 24 to 26, characterized by ^{129}Xe as a hyperpolarized noble gas.

28. The solvent according to any of the previous claims 24 to 27, characterized in that its melting point is lowered by dissolving hyperpolarized atomic nuclei or ^{13}C .

29. Contrast agents comprising a solvent with hyperpolarized atomic nuclei according to any of the previous claims 24 to 28.